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 pp 159-172.

GEOGRAPHY OF THE USSR TIMBER AND TIMBER-PROCESSING INDUSTRY

The forest-covered area in the USSR comprises about 700 million hectares, an area equivalent to 3.85 hectares per capita in the USSR. Of the country's forests, 78 percent are in the Asiatic USSR, 22 percent in the European USSR.

The forests of the USSR are still largely unknown. Vast forest areas have not only not been organized, i.e., are not covered by forestry exploitation plans, but have not even been explored. Prewar exploitation was carried out on an area of about 240 million hectares, i.e., on little more than one third of the total forest-covered area. Total timber resources have been estimated at about 40 billion cubic meters, or more than 200 cubic meters per capita. Average annual increment is about 600 million cubic meters. Correct economic practice permits annual cutting of about 2.5 percent of the available supply. This means that one billion cubic meters could be cut annually. Under forestry conditions prevailing in the USSR, annual cutting could considerably exceed annual increment since many forests consist of overripe trees, exploitation of which should be accelerated. If correct practice would permit annual felling of one billion cubic meters, or about 5 cubic meters per capita, while actual prewar felling totaled about 200 million cubic meters annually, or little more than one cubic meter per capita, it is clear that forest utilization is far from satisfactory in the USSR.

The enormous importance of wood to the national economy is illustrated by the fact that in 1940 about 8 million cubic meters of pit-prop timber were used in the coal industry alone; delivery of this required 400,000 railroad cars. The railroad car building plants required more than one million cubic meters of lumber in the [that?] year. One sixth of all fuel used in the USSR before the war was wood.

Timber is an important export of the USSR. Forests with export importance are those of Siberia, the timber of which is sent toward the Northern Sea Route, and those of the Far East, the timber of which is sent toward Pacific ports.

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In prerevolutionary Russia, the timber industry was mainly an extractive and not a processing industry. Russian timber was exported in raw, unprocessed form. Frequently, imported articles had been fabricated from Russian timber.

In 1913, 60 million cubic meters of timber were logged in Russia, including 33 million cubic meters of firewood and 27 million cubic meters of industrial timber. Postrevolutionary logging was as follows: 57 million cubic meters in 1928, 165 million in 1932, 202 million in 1937, and 233 million in 1940.

Of the 233 million cubic meters logged in 1940, 113 million (48 percent) were industrial wood and 120 million (52 percent) firewood.

Prior to the Stakhanovite movement, manual fellers each cut about 3 cubic meters of timber daily. Stakhanovite manual fellers raised their individual productivity to 10-20 and even 30 cubic meters daily.

The introduction of power saws, especially electric saws, was very important in the timber industry. Electric saws vary in weight between 16 and 40 kilograms. Operating from mobile electric power plants, electric saws saw up to 70 cubic meters of timber per shift. One power plant with a capacity of 10-12 kilowatts powers four to five saws. These plants are moved with tractors, horses, or manually. "Self-propelled" plants are mounted on either trucks or tractors. According to the 1946-1950 Five-Year Plan, more than 80 percent of the total volume to be logged is to be felled with electric saws.

After being felled, the timber must be delivered to the place from which it will be floated or hauled by rail. There are various methods of effecting this movement.

In winter, ice roads are mostly used for this purpose; they are of two kinds: solid ice roads, when the entire road is covered with ice, or track (koleynny) ice roads, when only the tracks are iced. Ice roads are practicable where the winters are constantly cold, water supplies for icing the roads are available, and the terrain is suitable.

In summer, a tractor can skid 30-40 cubic meters of timber per shift on an ordinary forest road, while in winter, on an ice road, it can easily haul 150-200 cubic meters loaded on single-runner sledges. Stakhanovite tractor drivers haul 300-400 and even 600 cubic meters on ice roads.

In summer, log slides, which may be likened to wooden rails and are made of logs laid end to end, are another method of moving timber out of the forest.

Timber skidding is performed with horses, trucks, or tractors. In 1941, about 4,000 tractors and about 1,500 trucks were engaged in logging operations. Use of gas-generator tractors is highly advantageous, because there are great difficulties in delivering liquid fuel into the forest. Another skidding method is the use of cableways.

Before the war, about 35 percent of all timber haulage in the USSR was by mechanized means. To extend mechanization of haulage, an important task is conversion from selective to clean felling of a cutting area. Such conversion would also raise the possibility of organizing MLS (mashinno-lesnyye stantsiya, machine timber stations), similar to MES in agriculture.

Up to 70 percent of all timber transport in the USSR is by floating. Floating operations are mechanized only slightly; mechanized methods are applied to some extent in raft building and in withdrawing timber from the water. Before the war, about 50 million cubic meters of timber were floated annually; of this amount, about 30 million cubic meters were made into rafts with the aid of rafting machines.

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Depletion of forests along the lower courses of rivers suitable for floating poses the task of exploiting the forests along their upper courses as well as those along small rivers and their tributaries. According to prewar data of the Ministry of River Fleet, there were 4,070 rivers with a total length of 166,000 kilometers in the Severnaya Dvina and Volga-Kama river basins, which are the main floating basins in the European USSR. Of that number, 1,515 rivers are not yet being exploited for floating timber. The total length of floating routes in the USSR was 300,000 kilometers in 1940, as compared with 175,000 kilometers in the prerevolutionary period. To facilitate floating, up to 20,000 kilometers of timber-guiding installations (booms) and about 400 large timber-intercepting ponds are established on the rivers every year.

In 1945, mechanization of floating operations rose to 65 percent for raft building, 80 percent for unloading, and 49 percent for loading operations.

The USSR as a whole is about 30 percent forest-covered, but the percentage varies greatly among the republics, e.g., the Karelo-Finnish SSR is about 60 percent forested, the Ukrainian SSR 7 percent, and the Kazakh SSR only 3.5 percent.

About 60 percent of the population lives in areas without forests, only 40 percent in areas with forests. As a result, distribution of logging operations was very uneven. In the heavily forested, but lightly populated northern European USSR, forest exploitation was negligible; in the less richly forested, but more heavily populated central and western regions, exploitation was more intensive. Thus, in 1934, about 0.5 cubic meter of timber was cut per hectare of forested area in the northern regions, while 2-4 cubic meters were cut per hectare of forested area in the central regions; the latter figure was three times the annual increment.

With the denudation of "near by" forests during the last 50-60 years, forests farther away came under exploitation. The result was longer timber transport distances. In the 1880's, the average rail transport distance was 160 kilometers; in the 1890's, it had risen to 300 kilometers; and in 1913, to 453 kilometers. In the postrevolutionary period, it increased greatly, and, by 1939, it had risen to 1,061 kilometers. The transport distance for timber is 1½ times that for other shipments.

The average transport distance for pit-prop timber was particularly great, 1,295 kilometers in 1939, while it was 1,700 kilometers to the Donbass, 2,500 kilometers to the Transcaucasus, 1,500 kilometers to Central Asia.

The war caused substantial changes in logging operations. The occupied areas had accounted for 27 percent of prewar timber haulage. The Ukraine, Belorussia, Karelo-Finnish SSR, Baltic countries, and Leningrad, Kursk, Orel, and Voronezh oblasts had provided 28 percent of prewar lumber mill production, 64 percent of the plywood, and large quantities of ties. Almost all prewar oak felling was concentrated in these areas.

During the 4 war years, the front and the national economy of the country received 630 million cubic meters of wood, including 230 million cubic meters of timber and 400 million cubic meters of firewood. Difficult rail transport conditions during the war years again gave rise to intensive felling in the central regions. The average rail transport distance for timber loads dropped to 750 kilometers in 1944, as compared with 1,061 kilometers in 1939.

The change which occurred between 1940 and 1945 in participation of the various regions in timber haulage is shown in the following table (in percent):

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<u>Regions</u>	<u>1940</u>	<u>1945</u>
North		
Karelo-Finnish SSR	13.3	10.0
Northwest	3.9	1.4
West	5.0	4.1
Central Region	7.7	7.4
Urals	23.6	28.6
West Siberia	16.6	18.1
East Siberia	7.2	7.8
Far East	8.9	6.8
Other regions of the USSR	6.1	4.8
	<u>7.7</u>	<u>11.0</u>
	100	100.0

Before the war, timber shipments made up one tenth of all rail freight turnover, one half of all water transport freight turnover.

Interregional transport of timber from the forested regions can be basically characterized as follows:

The North supplies Leningrad Oblast, the Central Industrial Region, and the Central Chernozem Region, and provides timber for export. The west supplies the Ukraine and, to some extent, contiguous areas of the Central Region. Kalinin, Yaroslavl', Ivanovo, and Gor'kiy oblasts (upper Volga oblasts) send their timber to the Central Industrial Region and down the Volga to the Volga Region, Caucasus, and Ukraine. Ural timber is sent down the Kama and Volga into the Volga Region, Ukraine, North Caucasus, and Transcaucasus as well as into Kazakhstan and Central Asia. West Siberia timber is also dispatched to Kazakhstan and Central Asia.

According to the 1946 - 1950 Five-Year Plan, 280 million cubic meters of wood (180 million industrial wood, 100 million firewood) are to be provided to the national economy annually, as compared with 233 million cubic meters (113 million industrial, 120 million firewood) in 1940. Thus, haulage of firewood is to be cut 20 percent, haulage of industrial wood increased 59 percent.

The main consumers of industrial wood in 1950 are planned to be:

<u>Consumer</u>	<u>Million Cubic Meters</u>
Construction (industrial and housing)	75
Coal and ore mining	12
Tire production	10
Cellulose and paper production	8
Automobile, railroad car, and agricultural machinery production	4
Wood packaging material production	12
Plywood and match production	2
Shipbuilding	2

Logging volume changes in the main regions according to the Five-Year Plan, based on 1940 as 100, are as follows (in percent):

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<u>Regions</u>	<u>1940</u>	<u>1945</u>	<u>1950</u>
North	100	61.3	106.9
Karelo-Finnish SSR	100	36.5	115.0
Northwest	100	65.3	98.3
West	100	102.3	115.9
Central Region	100	90.3	110.8
Volga Region	100	120.2	104.2
Urals	100	83.8	132.1
West Siberia	100	81.6	135.4
East Siberia	100	57.5	101.9
Far East	100	62.5	143.8

During the war years, forest massifs in occupied areas were severely damaged. For example, during their 3-year occupation of Belorussia, the occupation forces felled 36,000 hectares of forest along rivers, railroad lines, and highways, ruined 74,000 hectares through haphazard felling, and either ruined completely or injured 580,000 hectares of the most valuable forest massifs.

During the Fourth Five-Year Plan period, special attention is to be paid to the forest massifs of the Kama basin. In 1950, up to 20 million cubic meters of wood are to be felled along the Kama and its Vyatka, Vishera, and Chusovaya tributaries. The Kama basin forest massifs occupy an area of 11 million hectares with resources from ripe and almost ripe trees of about one billion cubic meters. Before the war, not even one half of the annual increment was logged.

Before the war, there were more than 2,000 lumber mills with 4,500 saw frames in the USSR. In the course of the five-year plans, the Arkhangel'sk Lumber Mill imeni Molotov was equipped with 24 frames. It is not only the largest mill in the USSR, but it has the greatest capacity of any mill in Europe. The modern timber-processing combine usually has a planing shop, construction accessories shop, and box shop in addition to its main sawmilling shop. Materials to be processed are first dried; about 0.65 ton of steam is required to kiln-dry a cubic meter of wood. The most suitable type of power plant for timber-processing plants is the dual-purpose heat and electric power plant, which uses waste materials as fuel. One kilogram of wood fuel produces about 2 kilograms of steam.

In 1950, lumber production is to total 39 million cubic meters, an increase of 14 percent over 1940. Production capacity for the sawmilling of 6 million cubic meters of lumber is to be put in operation during the plan period.

Geographic distribution of the USSR sawmilling industry is closely connected with the distribution of raw material resources. Arkhangel'sk Oblast holds first place in the output of lumber. Large sawmilling points are located at the mouths of the Onega, Mezen', and Severnaya Dvina rivers, down which timber is floated. These northern points produce lumber partly for domestic use, partly for export. Another group of lumber mills is located along the Northern Railroad System (Vologda, Plesetsk, and elsewhere) and along the Kirov Railroad System (Suna, Belomorsk, and elsewhere).

In the Urals, large lumber mills are found at Krasnovishersk, Lobva, Lyalya, Tavda, and Ufa.

In spite of a lack of forests there, the sawmilling industry has become widely developed in the Lower Volga Region in Stalingrad Oblast. Stalingrad is in a geographically favorable position to receive timber floated down the Volga and to dispatch it in processed form to the lightly wooded Ukraine, North Caucasus, and Transcaucasus.

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Before the war, much timber was also floated down the Dnepr to the lumber mills at Kiev, Cherkass, Kremenchug, Dnepropetrovsk, and Zaporozh'ye. In Siberia, the main sawmilling centers are located along the Siberian Railroad -- at Omsk, Novosibirsk, Krasnoyarsk, Kansk, and Irkutsk -- and also along the Ob' and Yenisey rivers. There is a large mill in Igarka, along the lower course of the Yenisey. The Siberian mills provide most of the lumber exported; it is shipped out through the Northern Sea Route.

Closely associated with the sawmilling industry is the plywood industry. The main raw materials for plywood are birch and, to some extent, alder. One-ply plywood is called carved or sliced plywood (nozhovaya fanera) in distinction from veneered plywood (vinirovannaya fanera) obtained by glueing together three, five, or more sheets of plywood. Plywood is of various thicknesses (3, 5, 9 millimeters). About 2.5 cubic meters of wood are required to produce one cubic meter of plywood. Plywood factories are located in the mixed forest zone -- Belorussia, Leningrad Oblast, Gor'kiy Oblast, Bashkir ASSR, and Sverdlovsk Oblast.

In 1913, 130,000 square [sic] meters of plywood were produced in Russia. During the five-year plans, production rose to more than five times this amount.

Before the Revolution, only about 30 million rubles' worth of furniture was produced [annually?]. In 1940, furniture output was valued at 1.2 billion rubles. Production was concentrated mostly in the large centers -- Moscow, Leningrad, Kiev -- and only one third was distributed among small factories in other areas. During the war, the furniture factories were converted to defense work. After the war, the question arose of more rational distribution of furniture factories to cut transportation costs. About 1.5 tons of furniture can be transported in one railroad car; this means that only 10-12 percent of the car's load capacity is used. The cost of packing one ton of furniture is about 560 rubles. Transport costs per ton are about 70 rubles for a distance up to 500 kilometers, about 110 rubles for up to 800 kilometers, and about 170 rubles for up to 1,500 kilometers.

Deciduous species, especially aspen, are the raw material for match production. Before the war, the match industry was concentrated in western regions; the match factories of the Belorussian SSR and Orel Oblast accounted for about one half of all capacity, even though only about one tenth of the country's aspen resources were found there. After the war, the eastern regions, where the main aspen stands are found (the Urals, Siberia, Far East), are to play a greater role in match production.

In 1913, about 4.3 million cases of matches were produced in 115 factories. Before the war, about 8 million cases were put out in 18 factories. The 1946 - 1950 plan envisages addition of enough new capacity to produce 7.5 million cases (7.5 billion boxes).

Vast amounts of waste materials result from mechanical wood processing. When a tree is felled, about 20 percent of its wood becomes waste material; branches, 8 percent; crown, 2 percent; the stump, 10 percent. In sawmilling, about 40 percent of the log becomes waste: slabs, 10 percent; shavings, 3 percent; edges, 10 percent; sawdust and cuttings, 12 percent; bark, 5 percent. When more refined processing, as in the cooperage, plywood, cabinet-making, furniture, and match industries, is carried on, about 50 percent of the material becomes waste. Altogether, about 75 percent of the original tree becomes waste. These waste materials should find greater utilization, particularly in wood chemical production and production of "wood plastics." The latter are ground wood, saturated with phenols, which is then either glued or lixiviated.

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Cellulose-Paper Production

Proportional output of paper factories of the various regions in 1913 is shown in the following table (in percent):

<u>Regions</u>	<u>Output</u>
Northern and Eastern	6.5
Central Industrial	13.8
Central Chernozem	4.6
Western	73.2
Others	1.9
	100.0

In 1913, 217,000 tons of paper were produced in Russia (within the 1939 boundaries). In Finland, then a part of the Russian Empire, 165,000 tons were produced in 1913. In the same year, 150,000 tons were imported into Russia. Consumption in Russia was at the rate of about 3 kilograms per capita.

In 1937, 831,000 tons of paper were produced in the USSR. Paper imports from abroad have been suspended entirely since 1935.

Distribution of the paper industry has undergone substantial changes. The role of the northern and eastern regions in paper production has been strengthened. Nevertheless, the northwestern and western regions continue to be important paper producers. Large factories in Leningrad Oblast include the Leningrad Paper Factory imeni Gor'kiy, Leningrad Paper Factory imeni Volodarskiy, Dubrovka Paper Factory along the upper Neva not far from Petrokrepost', and Okulovka Paper Factory in the railroad town of Okulovka. The Syavskiy Cellulose Plant is a new enterprise in Leningrad Oblast, charged with supplying with cellulose those paper factories which obtained it abroad before the Revolution.

The Karelo-Finnish SSR has the Kondopoga Factory, which started operation in 1923, and the Segezha Cellulose-Paper Combine, opened in 1939. There are also several cellulose and paper factories in that portion of Finland annexed by the USSR in 1939.

The "Geroy Truda," "Partak," "Krasnaya Zvezda," and Kondrovka factories are in the western region (Belorussian SSR and Smolensk Oblast).

The largest enterprise in the Central Region is the Balakhna Cellulose-Paper Combine, which started operation in 1928. Its raw material base is the Unzha Forest Massif. Timber reaches the combine in the form of rafts after traveling a distance of 250 kilometers. The combine has good connections with Moscow, its consumer. It receives two thirds of its electric power requirements from the Gor'kiy Rayon Electric Power Station, the other third from its own heat and electric power plants.

In the northern region, the "Sokol" Factory imeni Kuybyshev near Vologda and the large Solombala Cellulose Plant located on Solombala Island in Arkhangel'sk were erected after the Revolution. The latter is a sulfate cellulose plant, operating on waste materials of the Arkhangel'sk lumber mills.

In the Urals, the Novo-Lyalya Paper Combine in Sverdlovsk Oblast has been reconstructed. New enterprises are the Krasnov'shersk and Kama combines. The latter is one of the largest in the USSR.

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Other enterprises developed since the Revolution are the Ingurskiy Combine in the Transcaucasus and the Tashkent Factory, the first paper factory in Central Asia. The Tashkent Paper Factory was built during the First Five-Year Plan.

There were several paper factories in the Ukraine before the war; they operated largely on Ukrainian wood. Conversion to operation on straw is a basic problem facing Ukrainian factories. In the southern European USSR, it takes 50 years to restore a timber-cutting area, while 50 million tons of unused straw are available every year. A ton of cellulose can be obtained from 2.5 tons of straw. A paper factory could be supplied with straw from the surrounding area within a radius of 50-60 kilometers.

The paper industry suffered severely during the war; 46 enterprises were either completely or partly destroyed. A considerable portion of the equipment was evacuated to the eastern regions. Relocation of equipment was completed in 1945. By 1946, 31 paper machines were back in operation. Operations were resumed at the Leningrad Factories imeni Gor'kiy and imeni Volodarskiy, Kamensk Factory, Kondrovka Factory, "Geroy Truda" Factory, the Karelian factories, and others. Cellulose production was resumed at the Syavskiy and Segezha combines.

The paper industry in the annexed areas is of considerable importance. Cellulose-paper enterprises in Kaliningrad Oblast have been reconstructed. The Transcarpathian Ukraine offers raw material for the paper industry in the form of its coniferous forests. Southern Sakhalin has about ten cellulose-paper enterprises.

In accordance with the 1946 - 1950 Five-Year Plan, the paper industry is to have been fully rehabilitated by 1948, and by 1950 paper production is to have risen 65 percent above the prewar level.

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